

MICHIGAN DEPARTMENT OF HISTORY, ARTS, AND LIBRARIES

TECHNICAL STANDARDS **FOR CAPTURING MICROFILM IMAGES FROM PAPER**

(By authority conferred on the department of history, arts, and libraries by sections 2 and 4 of the records reproduction act, 1992 PA 116, section 2 as amended by 2004 PA 572 and section 4 as added by 2004 PA 574, MCL 24.402 and 24.404)

Section 1. Applicability and intent

Sec. 1. These standards apply to the conversion of public records from paper to microfilm for the purpose of maintaining official records in a microfilm format. These standards focus primarily on the production of roll microfilm but also apply to other micrographic formats.

Section 2. Definitions

Sec. 2. (1) As used in these standards, the following definitions apply:

- (a) "Act" means the records reproduction act, 1992 PA 116, MCL 24.401 et seq.
- (b) "Agency" means a governmental entity or a governmental official acting in his or her official capacity, including but not limited to a state officer, employee, department, bureau, center, division, board, commission, council, authority, or other independent or dependent subunit of the executive branch of state government; an agency, board, commission, or council in the legislative branch of state government; the judiciary; and a county, city, village, intercounty, intercity, or regional governing body, council, school district, special district, or other municipal corporation, or a board, department, commission, council, or other independent or dependent subunit of a municipal corporation.
- (c) "Base-plus-fog" means film that has been processed but not exposed.
- (d) "Department" means the department of history, arts, and libraries.
- (e) "D-MAX" means the highest density achieved in an exposed and processed image.
- (f) "D-MIN" means the lowest density achieved in an exposed and processed image.
- (g) "Expungement" means the removal or destruction of an image from a microfilm recording.
- (h) "Quality assurance" means the process by which the total product is examined to ensure that the quality criteria initially established in the pre-production test have been met.
- (i) "Quality control" means and consists of those steps that are incorporated into the production process and are designed specifically to reduce error.
- (j) "Reduction ratio" means the relationship between the dimensions of an original and the dimensions of the corresponding microcopy.
- (k) "Resolution" means the ability of a photographic system, including but not limited to film, lens, and processing, to record fine detail. Images shall not appear as fuzzy or unclear.
- (l) "Standards" means the technical standards adopted in this set of technical standards.
- (m) "State archives" means the state archives of Michigan.

(2) The definitions listed in section 1 of the act apply to these standards.

Section 3. Archival records

Sec. 3. Some microfilm formats and techniques are not suitable for the long-term retention of public records. Issues that affect the permanent preservation of the records include but are not limited to organization, indexing, format, resolution, and storage media. An agency with a question about the suitability of a microfilm format or technique for archival storage may contact the state archives for information and technical assistance.

Section 4. Agency responsibilities

Sec. 4. (1) An agency is responsible for managing its records and information. An agency shall implement appropriate policies, procedures, and business practices, in order to ensure that a microfilm system selected will protect the authenticity, reliability, integrity, and usability of the records contained in the system and will address a migration path to a new system which will provide complete protection for the full retention period of the records stored in the system.

(2) If an independent contractor, a consultant, or some other party outside of government produces a reproduction of a record for an agency, the agency shall ensure that the party acts in compliance with these standards. An agency may ensure compliance through execution of a contract that contains adequate legal safeguards.

Section 5. Microfilm format standard

Sec. 5. These standards focus primarily on the production of 16mm and 35mm roll microfilm. Formats other than roll microfilm may be used in place of the original record. These micrographic formats include Computer Output Microfilm, microfilm jackets, aperture cards and step and repeat microfiche.

Section 6. Reduction ratio standard

Sec. 6. (1) The selection of a reduction ratio is application specific. An agency shall take into account the characteristics of the record, the tasks the system is designed to perform, and the user requirements to be satisfied when selecting a reduction ratio.

(2) If the reduction ratio is changed within a roll, the change shall be indicated by the operator on a film target.

Section 7. Resolution standard

Sec. 7. (1) For common type fonts of 8 point or greater, the level of resolution for a rotary camera shall be a minimum of 90 line pairs per millimeter using a microscope with a 100 x lens.

(2) For common type fonts of 8 point or greater, the level of resolution for a planetary camera shall be a minimum of 120 line pairs per millimeter using a microscope with a 100 x lens.

(3) Resolution shall be determined by reading the line count and direction method using the ISO test chart No. 2 or a similar chart for planetary cameras and the ANSI/AIIM MS17-1992 test chart or a similar chart for rotary cameras.

(4) Resolution shall be determined by sighting the line pair pattern where all 5 lines and spaces in both the horizontal and vertical direction can be discerned. The effective resolution is the numeric result of multiplying the numbered pattern that can be viewed as described by the known reduction ratio of the image.

(5) Resolution shall meet the minimum line pairs in all 4 corners, plus the center of the each resolution chart contained on the roll of film.

(6) For smaller type fonts, embellished type fonts, and hand written documents, acceptability levels shall be directly related to the document collection. An agency shall employ the quality index (QI) method for determining resolution. For additional information, an agency may refer to ANSI/AIIM MS23-1998 – Practice for Operational Procedures / Inspection and Quality Control of First-Generation Silver-Gelatin Microfilm of Documents.

(7) Images shall exhibit a degree of legibility and readability comparable to the source document.

Section 8. Density standard

Sec 8. (1) D-MAX range shall be from .80 to 1.20.

(2) D-MIN shall not be greater than .06.

(3) Base-plus-fog shall not exceed 0.06.

(4) Density measurements shall be made using a properly calibrated densitometer.

(5) An agency may justify the use of a different density level if the agency determines through testing that the desired results of the capture process cannot meet the agency's business needs using the standard density parameters.

Section 9. Document preparation standard

Sec. 9. (1) An agency shall engage in document preparation prior to microfilming a record, a record series, or a collection of records.

(2) Images on microfilm shall be organized in a manner that facilitates retrieval.

Section 10. Indexing standard

Sec. 10. (1) An agency may use any functional method to index microfilm records, if the method adequately addresses all necessary characteristics of the microfilmed records and end-user retrieval requirements.

(2) Acceptable indexes include but are not limited to databases, spreadsheets, file naming conventions, registers or other finding aids.

(3) If registers or finding aids are microfilmed, they shall be placed in the first frames of the first roll of a series. In the alternative, they may be placed in the last frames of the last roll of a series or in the last frames of the last microfiche of a series.

(4) An agency may microfilm the placement of flash cards or dividers in order to facilitate rapidly locating specific information on a roll of film.

Section 11. Targeting standard

Sec. 11. An agency shall use the following film targets shall be used to certify the authenticity and facilitate the quality inspection process of the records being filmed:

(a) At the beginning of roll, density/resolution target using the ISO test chart No. 2 or a similar chart for planetary cameras or ANSI/AIIM MS17-1992 test chart or a similar chart for rotary cameras, and a start target/certification of authenticity.

(b) Throughout roll, flash targets, correction targets, omission targets, retake targets, or additional targets as necessary.

(c) At the end of roll, end target/certification of authenticity and a density/resolution target using the ISO test chart No.2 or a similar chart for planetary cameras or the ANSI/AIIM MS17-1992 test chart or a similar chart for rotary cameras.

Section 12. Film leader/trailer standard

Sec. 12. Not less than a 3-foot leader of film shall be included before the first target of the roll of film. Not less than a 3-foot trailer shall be included after the last target of the roll of film.

Section 13. Media standard

Sec. 13. (1) Original or master film shall be polyester based silver gelatin film, LE-500.

(2) An agency shall produce a duplicate for daily use, if microfilm is expected to be handled more than 10 times during the film's lifetime.

Section 14. Silver film processing standard

Sec. 14. (1) An agency shall process exposed microfilm within two weeks of the completion of the capturing an image on microfilm.

(2) For more information regarding proper processing of silver film, an agency may refer to ISO 18901:2002 – Imaging materials – Processed silver-gelatin type black-and-white films – Specifications for stability and/or ANSI/AIIM MS23-1998 – Practice for Operational Procedures / Inspection and Quality Control of First-Generation Silver-Gelatin Microfilm of Documents .

- (3) An agency shall perform testing for residual thiosulfates not less than once per week.
- (4) LE-500 films shall contain not more than 0.014 g of thiosulfate ion per m².

Section 15. Splicing and retake standard

Sec. 15. (1) A single roll of film shall contain not more than one splice.

- (2) If during the normal inspection process an agency determines that errors in the filming process have taken place, the agency may correct images on a separate roll of film and add the corrections to the beginning or end of the original roll.
- (3) Corrections shall be clearly identified both on the roll itself and on the label of the roll. The corrective film shall contain a list of the retaken images in front of the images being added.
- (4) Splicing shall be used only for corrective action and not be part of the normal operation of creating a roll of microfilm. The splice shall be made not less than 6 inches from the end of roll target. A splice shall contain not more than 3 retakes and shall not exceed 2 linear feet of film. Splices may be made using heat, ultrasonic or splice tape manufactured specifically for that purpose. A splice shall not be made at any point between the start target and the end target of the film.
- (5) A single re-take may contain a single image or multiple consecutive images as displayed on the original film.
- (6) Splices are to be butt splices not overlap splices. Edges of a splice shall not be off-set. Off-set may be trimmed to provide a smooth edge.
- (8) If tape splices are used, the tape material shall not contain any rubber-based adhesives.
- (9) If the filming operator detects an error immediately at the time of filming, the operator may correct the error by filming a start retake target followed immediately by the corrected images followed by an end retake target..

Section 16. Expungement standard

- Sec. 16. (1) An agency shall perform expungement of microfilm images only in accordance with a court order or to satisfy an approved retention policy.
- (2) Expungement shall be performed by using the abrasion method.
 - (3) An agency shall create and maintain an expungement certificate that details the reason for the expungement, the authority to expunge, the date of the original filming and the date of the expungement. The expungement certification shall indicate that the original and all known copies have been expunged.

Section 17. Quality control standard

Sec. 17. (1) An agency shall assemble a sample set of source documents or records equivalent in characteristics to the source documents for the purposes of evaluating camera results against defined quality criteria prior to production.

(2) An agency shall establish quality control criteria based upon the results of the pre-production quality sample. The production process shall take account of the quality control criteria.

(3) An agency shall produce a new sample for quality if the conditions or attributes of documents to be microfilmed change or if the equipment used to microfilm the documents change.

Section 18. Quality assurance standard

Sec. 18. (1) An agency shall adopt written quality assurance procedures for inspection of microfilm images that are produced.

(2) Quality assurance shall be conducted before the original documents are destroyed.

(3) For more information regarding quality assurance, an agency may refer to ANSI/AIIM TR34-1996 - Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems.

APPENDIX A

REFERENCES

NATIONAL STANDARDS AND RECOMMENDED PRACTICES

The following national standards and recommended practices issued by the American National Standards Institute (ANSI), the Association for Information and Image Management (AIIM), and the International Association for Standards (ISO) may contain additional information that will assist state agencies and local government with complying with Michigan law. These publications are available from the Association for Information and Image Management, 1100 Wayne Ave., Suite 1100, Silver Spring, MD 20910-5699, <http://www.ansi.org/>.

ANSI/AIIM MS1-1996 – Recommended Practice for Alphanumeric Computer-Output Microform – Operational Practices for Inspection and Quality Control

ANSI/AIIM MS4-1987 – Flowchart Symbols and Their Use in Micrographics

ANSI/AIIM MS5-1992 (R1998) – Microfiche

ANSI/AIIM MS6-1981 (R1993) (R1999) – Microfilm Packaging Labeling

ANSI/AIIM MS8-1988 (R1998) – Image Mark (Blip) Used in Image Mark Retrieval Systems

ANSI/AIIM MS9-1987 (A1996) – Method of Measuring Thickness of Buildup Area on Unitized Microfilm Carriers (Aperture, Camera, Copy and Image Cards)

ANSI/AIIM MS10-1987 (R1993) – Method for Determining Adhesion of Protection Sheet to Aperture Adhesive of Unitized Microfilm Carrier (Aperture Card)

ANSI/AIIM MS11-1987 (R1993) (R1999)– Microfilm Jackets

ANSI/AIIM MS12-1990 – Readers for Transparent Microforms – Methods for Measuring Performance Characteristics

ANSI/AIIM MS14-1988 (R1996) – Specifications for 16 and 35 mm Roll Microfilm

ANSI/AIIM MS15-1990 – Dimensions and Operational Constraints for Single Core Cartridge for 16 mm Processed Microfilm

ANSI/AIIM MS17-1992 – Rotary (Flow) Microfilm Camera Test Chart and Test Target – Descriptions and Use

ANSI/AIIM MS18-1992 (R1998) – Splices for Imaged Film – Dimensions and Operational Constraints

ANSI/AIIM MS19-1993 – Recommended Practice for Identification of Microforms

ANSI/AIIM MS20-1990 – Readers for Transparent Microforms – Performance Characteristics

ANSI/AIIM MS23-1998 – Practice for Operational Procedures / Inspection and Quality Control of First-Generation Silver-Gelatin Microfilm of Documents

ANSI/AIIM MS24-1996 – Test Target for Use in Microrecording Engineering Graphics on 35 mm Microfilm

ANSI/AIIM MS26-1990 – 35 mm Planetary Cameras (top light) – Procedures for Determining Illumination Uniformity of Microfilming Engineering Drawings

ANSI/AIIM MS26A-1999 – Amendment - 35 mm Planetary Cameras (top light) – Procedures for Determining Illumination Uniformity of Microfilming Engineering Drawings

ANSI/AIIM MS28-1996 – Alphanumeric COM Quality Test Slide

ANSI/AIIM MS29-1992 – Cores and Spools for Recording Equipment – Dimensions

ANSI/AIIM MS32-1996 – Microrecording of Engineering Source Documents on 35 mm Microfilm

ANSI/AIIM MS34-1990 – Dimension for Reels Used with Processed 16mm and 35 mm Microfilm Not for Use in Automatic Threading Equipment

ANSI/AIIM MS35-1990 – Recommended Practice for the Requirements and Characteristics of Original Documents that may be Microfilmed

ANSI/AIIM MS36-1990 – Reader-Printers

ANSI/AIIM MS37-1988 (A1996) – Recommended Practice for Microphotography of Cartographic Materials

ANSI/AIIM MS38-1995 – Microrecording of Engineering Graphics – Computer-Output Microfilm

ANSI/AIIM MS39-19987 – Recommended Practice for Operational Procedures, Quality Control & Inspection of Graphic Computer-Output Microforms

ANSI/AIIM MS40-1987 (R1992) (1999) – Microfilm Computer Assisted Retrieval (CAR) Interface Commands

ANSI/AIIM MS41-1996 – Dimensions of Unitized Microfilm Carriers and Apertures (Aperture, Camera, Copy and Image Cards)

ANSI/AIIM MS42-1989 – Recommended Practice for the Expungement, Deletion, Correction or Amendment of Record on Microforms

ANSI/AIIM MS43-1998 – Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and from COM

ANSI/AIIM MS45-1990 – Recommended Practice for Inspection of Stored Silver Gelatin Microforms for Evidence of Deterioration

ANSI/AIIM MS46-1990 (A1996) – Test Target and Test Method for Determining Output of 35 mm Microfilm Duplicators

ANSI/AIIM MS47-1990 – Rotary Cameras for 16 mm Microfilm – Mechanical and Optical Characteristics

ANSI/AIIM MS48-1990 – Recommended Practice for Microfilming Public Records on Silver Halide Film

ANSI/AIIM MS51-1991, ANSI/ISO 3334-1989 ISO Chart No.2 – Description and Use in Photographic Reproduction

ANSI/AIIM MS111-1994 – Recommended Practice for Microfilming Printed Newspapers on 35 mm Microfilm

ANSI/AIIM TR1-1988 (A1992) – Guidelines for Metrics

ANSI/AIIM TR2-1998 – Glossary of Document Technologies

ANSI/AIIM TR4-1989 (A1993) – Silver Recovery Techniques

ANSI/AIIM TR9-1989 (R1992) – Color Microforms

ANSI/AIIM TR11-1987 (A1993) – Microfilm Jacket Formatting and Loading Techniques

ANSI/AIIM TR12-1988 (R1997) – Bar Coding on Microfiche for Production and Dynamic Distribution Control

ANSI/AIIM TR13-1998 – Preservation of Microforms in an Active Environment – Guideline

ANSI/AIIM TR16-1988 – Content of Production Specification Sheets for Microform Readers and Reader-Printers

ANSI/AIIM TR20-1994 – Environmental and Right-to-Know Regulations Affecting Microfilm Processors

ANSI/AIIM TR26-1993 – Resolution as it Relates to Photographic and Electronic Imaging

ANSI/AIIM TR34-1996 – Sampling Procedures for Inspection by Attributes of Images in Electronic Image Management (EIM) and Micrographics Systems

ANSI/NAPM IT9.1-1992 – American National Standard for Imaging Media (Film)-Silver Gelatin Type-Specifications for Stability

ANSI/NAPM IT9.2-1991 – American National Standard for Imaging Media-Photographic Processed Films, Plates and Papers-Filing Enclosures for Safety Films

ANSI IT9.5-1992 – Imaging Media (Film)-Ammonia-Processed Diazo Films-Specifications for Stability

ANSI/NAPM IT9.6-1991 – American National Standard for Photography-Photographic Films-Specifications for Safety Film

ANSI IT9.12-1991 – Photography-Processed Vesicular Photographic Film-Specifications for Stability

ANSI/NAPM IT9.17-1993 – Photography-Determination of Residual Thiosulfate and Other Related Chemicals in Processing Photographic Materials-Methods Using Iodine-Amylose, Methylene Blue and Silver Sulfide

ISO 15489-1:2001 – Information and Documentation – Records Management – Part 1 – General

ISO 15489-2:2001 – Information and Documentation – Records Management – Part 2 – Guidelines

ISO 18901:2002 – Imaging materials – Processed silver-gelatin type black-and-white films – Specifications for stability

ISO 18911:2000 – Photography -- Processed safety photographic films -- Storage practices (formerly ANSI/NAPM IT9.11-1993)